

## ABSTRACT

Methods and apparatus are provided for manufacturing a medical device. An implantable medical device includes a semiconductor substrate, an epitaxial layer, and a power transistor. The epitaxial layer overlies the semiconductor substrate. The power transistor is formed in the epitaxial layer and includes a first electrode, a control electrode, and a second electrode. The power transistor has a voltage breakdown greater than 100 volts. The current flow of the power transistor is vertical through the epitaxial layer to the semiconductor substrate. A backside contact couples to the first electrode of the power transistor. A method of manufacturing a medical device includes a power transistor formed in an epitaxial layer overlying a semiconductor substrate. A deep trench is etched through the epitaxial layer exposing the semiconductor substrate. A first electrode contact region couples to an exposed area of the semiconductor substrate in the deep trench.